

What is claimed is:

[Claim 1] 1. An x-ray imaging system comprising:

an x-ray detector configured to detect radiation emitted by an x-ray source and attenuated by a subject to be imaged, and provide an electrical output that may be processed for reconstruction of an image of the subject; and

at least one electronic sensor configured to detect gravitational loads placed on the x-ray detector.

[Claim 2] 2. The system of claim 1 wherein the x-ray detector includes a circuit board with electronics to control operation of the detector and wherein the at least one electronic sensor is disposed on the circuit board.

[Claim 3] 3. The system of claim 1 wherein the at least one electronic sensor is powered by a power supply of an x-ray scanner when the x-ray detector is tethered to the x-ray scanner.

[Claim 4] 4. The system of claim 1 further comprising a battery disposed in the x-ray detector that provides power to the at least one electronic sensor.

[Claim 5] 5. The system of claim 1 further comprising a controller configured to read out data from the at least one electronic sensor at predefined intervals.

[Claim 6] 6. The system of claim 5 wherein the controller is configured to read out data from the electronic sensor at 250 µs intervals.

[Claim 7] 7. The system of claim 5 wherein the controller is further configured to assign at least one of a time and a date stamp to each reading of an electronic sensor.

[Claim 8] 8. The system of claim 7 wherein the controller is further configured to store readings from an electronic sensor in a log.

[Claim 9] 9. The system of claim 8 wherein the controller is further configured to write over readings stored on the log such that a limited number of readings are stored in the log.

[Claim 10] 10. The system of claim 9 wherein the controller is further configured to compare the gravitational load from a current reading of an electronic sensor to that of a stored reading in the log and if the gravitational load of the current reading exceeds that of the stored reading, then overwrite the stored reading with the current reading.

[Claim 11] 11. The system of claim 5 wherein the controller is further configured to compare the gravitational load of a current reading of an electronic sensor to a threshold and illuminate an LED on the x-ray detector based on the comparison.

[Claim 12] 12. The system of claim 11 wherein the controller is further configured to illuminate a failure LED if the gravitational load of a current reading of an electronic sensor is equal to or greater than a maximum allowable gravitational load.

[Claim 13] 13. The system of claim 11 wherein the controller is further configured to power down electronics of the x-ray detector if the gravitational load of a current reading of an electronic sensor is equal to or greater than a maximum allowable gravitational load.

[Claim 14] 14. The system of claim 11 wherein the controller is further configured to provide an error message to a processor to be used to warn a user of a potentially damaging gravitational event.

[Claim 15] 15. The system of claim 11 wherein the controller is further configured to proactively initiate and report self-test diagnostics in response to a threshold exceeding gravitational event.

[Claim 16] 16. The system of claim 11 wherein the threshold is 10G.

[Claim 17] 17. The system of claim 1 wherein the x-ray detector includes flash storage connected to store data output by the electronic sensor.

[Claim 18] 18. The system of claim 1 further comprising one or more mechanical sensors that mechanically detect gravitational loads placed on the x-ray detector.

[Claim 19] 19. The system of claim 18 wherein the one or more mechanical sensors includes a fluid filled label sealed to a surface of the x-ray detector, wherein the fluid changes color when exposed to a given gravitational load.

[Claim 20] 20. The system of claim 1 wherein the at least one electronic sensor includes a plurality of accelerometers.

[Claim 21] 21. An x-ray detector comprising:

a scintillator configured to emit light in response to reception of radiation;

a detector element array having a plurality of detector elements, each detector element configured to detect light from the scintillator and provide an electrical signal that may be processed for image reconstruction; and

an accelerometer configured to detect gravitational events and measure a gravitational load placed on the x-ray detector of a gravitational event.

[Claim 22] 22. The x-ray detector of claim 21 wherein the accelerometer is configured to assign at least one of a time and a date to a measured gravitational event.

[Claim 23] 23. The x-ray detector of claim 22 wherein the accelerometer includes RAM and is further configured to record data for the measured gravitational event in RAM.

[Claim 24] 24. The x-ray detector of claim 23 wherein the accelerometer is further configured to replace recorded data such that data for a single measured gravitational event is recorded.

[Claim 25] 25. The x-ray detector of claim 24 wherein the accelerometer is further configured to compare a currently measured gravitational event to the recorded gravitational event and, if the currently measured gravitational event has a greater measured gravitational force than that of the recorded gravitational event, then replace data for the recorded gravitational event with that of the currently measured gravitational event.

[Claim 26] 26. The x-ray detector of claim 23 wherein the RAM is configured to be cleared out following each readout of data stored therein.

[Claim 27] 27. The x-ray detector of claim 21 further comprising a battery to power the accelerometer.

[Claim 28] 28. The x-ray detector of claim 21 wherein the accelerometer is configured to sample a gravitational load on the x-ray detector at a sampling rate of 4 kHz.

[Claim 29] 29. An x-ray scanner comprising:

an x-ray source configured to project radiation at a subject;

an x-ray detector configured to detect radiation projected at and attenuated by the subject, the x-ray detector having an electronic means of measuring a gravitational load placed on the x-ray detector; and

 a controller configured to read out data from the electronic means and determine if the x-ray detector has been subjected to a potentially damaging gravitational load.

[Claim 30] 30. The x-ray scanner of claim 29 wherein the electronic means includes means for associating at least one of a time and a date to a measured gravitational load event.

[Claim 31] 31. The x-ray scanner of claim 29 wherein the controller is further configured to output one of audio and a visual indication that the x-ray detector has been subjected to a potentially damaging gravitational load.

[Claim 32] 32. The x-ray scanner of claim 29 wherein the electronic means includes an accelerometer.

[Claim 33] 33. The x-ray scanner of claim 29 wherein the controller is further configured to acquire data from the electronic means when the x-ray detector is connected thereto and further configured to maintain a database of data acquired from the electronic means.